

WHAT IS CLAIMED IS:

1. A sheet feeder, comprising:

a sheet holding member that holds a sheet;

a pick-up roller that feeds the sheet held by the sheet holding member;

5 a holder member that rotatably supports the pick-up roller;

a drive shaft that supports the holder member and is directly or indirectly connected to the pick-up roller;

10 a frame member that rotatably supports each end of the drive shaft in a direction of an axis thereof;

15 a drive unit that applies rotating force to the drive shaft supported by the frame member;

a transmission member that surrounds an end of the drive shaft in the direction of the axis thereof and transmits the rotating force applied by the drive unit thereto; and

20 15 a pressing member that presses the transmission member to the drive shaft with predetermined frictional force.

25 20 2. The sheet feeder according to claim 1, wherein the drive shaft has a contact surface that is provided on one end thereof in the direction of the axis thereof adjacent to the transmission member and contacts to a side surface of the transmission member, and the pressing member has an urging member that urges the transmission member toward the contact surface.

30 25 3. The sheet feeder according to claim 2, wherein the holder member includes a clutch member that is disposed between the drive shaft and the pick-up roller and that connects the drive shaft and the pick-up roller when the drive shaft supporting the holder member is rotated in a first direction, and disconnects the drive shaft and the pick-up roller when the drive shaft is rotated in an opposite direction from the first direction.

35 30 4. The sheet feeder according to claim 3, wherein the clutch member includes:

a first gear that is connected to the pick-up roller;

a second gear that is provided on the drive shaft apart from the first gear and rotates together with the drive shaft;

an arm member that has a collar section which rotatably inserts thereinto the drive shaft having the second gear and a protruding section which extends outwardly from the collar section and moves to a side to which the first gear is provided or an opposite side therefrom;

5 a clutch gear that is rotatably supported by the protruding section of the arm member and engaged with the second gear; and

a resisting member that applies a load to the clutch gear to move the arm member in association with rotation of the second gear engaged with the clutch gear.

10 5. The sheet feeder according to claim 4, wherein the first gear is disposed toward the sheet holding member with respect to the clutch gear supported by the protruding section of the arm member and engages with the clutch gear as the protruding section of the arm member is moved toward the sheet holding member.

15 6. The sheet feeder according to claim 4, wherein the holder member includes a restriction member that restricts a movement of the arm member toward the first gear when the clutch gear is engaged with the first gear.

7. The sheet feeder according to claim 1, wherein the holder member includes a clutch member that is disposed between the drive shaft and the pick-up roller, and that connects the drive shaft and the pick-up roller when the drive shaft is rotated in the first direction, and moves the holder member toward a side opposite to the sheet holding member when the drive shaft is rotated in the opposite direction from the first direction by transmitting the rotating force of the drive shaft to the holder member.

20 8. The sheet feeder according to claim 7, wherein the clutch member includes:

a first gear that is connected to the pick-up roller;

a second gear that is provided on the drive shaft apart from the first gear and rotates together with the drive shaft;

30 an arm member that has a collar section which rotatably inserts thereinto the drive shaft having the second gear and a protruding section which extends outwardly from the collar section and moves to a side to which the first gear is provided or an opposite side therefrom;

a clutch gear that is rotatably supported by the protruding section of the arm member and engaged with the second gear;

5 a resisting member that applies load to the clutch gear to move the arm member in association with rotation of the second gear engaged with the clutch gear; and

10 a holder frame that supports the pick-up roller disposed in the holder member and that is moved by the arm member to the opposite side from the side to which the first gear is provided.

9. The sheet feeder according to claim 8, wherein the first gear is disposed toward the sheet holding member with respect to the clutch gear supported by the protruding section of the arm member and engages with the clutch gear as the protruding section of the arm member is moved toward the sheet holding member.

15 10. The sheet feeder according to claim 8, wherein the holder member includes a restriction member that restricts a movement of the arm member toward the first gear when the clutch gear is engaged with the first gear.

11. The sheet feeder according to claim 1, wherein the holder member includes a clutch member that is disposed between the drive shaft and the pick-up roller and that connects the drive shaft and the pick-up roller when the drive shaft supporting the holder member is rotated in a first direction, and disconnects the drive shaft and the pick-up roller when the drive shaft is rotated in an opposite direction from the first direction.

12. The sheet feeder according to claim 11, wherein the clutch member includes:

25 a first gear that is connected to the pick-up roller;

a second gear that is provided on the drive shaft apart from the first gear and rotates together with the drive shaft;

30 an arm member that has a collar section which rotatably inserts thereinto the drive shaft having the second gear and a protruding section which extends outwardly from the collar section and moves to a side to which the first gear is provided or an opposite side therefrom;

a clutch gear that is rotatably supported by the protruding section of the arm member and engaged with the second gear; and

a resisting member that applies a load to the clutch gear to move the arm member in association with rotation of the second gear engaged with the clutch gear.

13. The sheet feeder according to claim 12, wherein the first gear is disposed toward the sheet holding member with respect to the clutch gear supported by the protruding section of the arm member and engages with the clutch gear as the protruding section of the arm member is moved toward the sheet holding member.

14. The sheet feeder according to claim 12, wherein the holder member includes a restriction member that restricts a movement of the arm member toward the first gear when the clutch gear is engaged with the first gear.

15. A pick-up roller unit mounted to a drive shaft of a printer for starting feed of a sheet of recording medium, comprising:

a holder member rotatably mounted to the drive shaft;

15 a drive gear mounted to the drive shaft, so as to rotate with the drive shaft, and within the holder member;

an arm member having a tubular collar portion through which the drive shaft passes and an arm extending from the collar portion;

20 a clutch gear rotatably mounted to the arm and engaged with the drive gear;

a pick-up roller mounted to the holder member away from the drive shaft, the pick-up roller having a gear section; and

an interposed gear engaged with the gear section and engageable with the clutch gear.

16. The pick-up roller unit according to claim 15, further comprising:

25 a spring winding portion extending from the holder member to enclose a segment of the drive shaft; and

a spring mounted on the spring winding portion, wherein one end of the spring engages the printer and the other end of the spring is attached to the holder member.

30 17. The pick-up roller unit according to claim 15, further comprising a resisting member between and contacting each of the clutch gear and the arm.

18. The pick-up roller unit according to claim 15, wherein the arm has a stopper section extending in each of opposing directions and from an end away from the tubular collar.

5 19. The pick-up roller unit according to claim 18, wherein each stopper section has a length greater than a radius of the clutch gear.

20. The pick-up roller unit according to claim 15, wherein the drive gear has a collar portion that non-rotatively fixes the drive gear to the drive shaft to rotate therewith.

10 21. The pick-up roller unit according to claim 20, wherein the drive gear has a stopper hook extending from the collar, the stopper hook engaging a recess in the drive shaft to prevent axial movement.

22. The pick-up roller unit according to claim 15, wherein the holder member comprises an upper frame and a lower frame connected together by a same means that attaches the other end of the spring to the holder member.

15 23. The pick-up roller unit according to claim 20, wherein the drive shaft has a flattened stopper face along and portion of a circumference thereof and the collar portion of the drive gear that a flattened key surface on an interior to mate with the flattened stopper face.

20 24. The sheet feeder according to claim 7, wherein the first gear is disposed toward the sheet holding member with respect to the clutch gear supported by the protruding section of the arm member and engages with the clutch gear as the protruding section of the arm member is moved toward the sheet holding member.

25 25. The sheet feeder according to claim 7, wherein the holder member includes a restriction member that restricts movement of the arm member toward the first gear when the clutch gear is engaged with the first gear.

30 26. The sheet feeder according to claim 2, wherein the holder member includes a clutch member that is disposed between the drive shaft and the pick-up roller, and that connects the drive shaft and the pick-up roller when the drive shaft is rotated in the first direction, and moves the holder member toward a side opposite to the sheet holding member when the drive shaft is rotated in the opposite direction from the first direction by transmitting the rotating force of the drive shaft to the holder member.

27. The sheet feeder according to claim 26, wherein the first gear is disposed toward the sheet holding member with respect to the clutch gear supported by the protruding section of the arm member and engages with the clutch gear as the protruding section of the arm member is moved toward the sheet holding member.

5 28. The sheet feeder according to claim 26, wherein the holder member includes a restriction member that restricts movement of the arm member toward the first gear when the clutch gear is engaged with the first gear.

29. The sheet feeder according to claim 26, wherein the clutch member includes:

10 a first gear that is connected to the pick-up roller;

a second gear that is provided on the drive shaft apart from the first gear and rotates together with the drive shaft;

15 an arm member that has a collar section which rotatably inserts thereinto the drive shaft having the second gear and a protruding section which extends outwardly from the collar section and moves to a side to which the first gear is provided or an opposite side therefrom;

a clutch gear that is rotatably supported by the protruding section of the arm member and engaged with the second gear;

20 a resisting member that applies load to the clutch gear to move the arm member in association with rotation of the second gear engaged with the clutch gear; and

a holder frame that supports the pick-up roller disposed in the holder member and that is moved by the arm member to the opposite side from the side to which the first gear is provided.

25 30. The sheet feeder according to claim 29, wherein the first gear is disposed toward the sheet holding member with respect to the clutch gear supported by the protruding section of the arm member and engages with the clutch gear as the protruding section of the arm member is moved toward the sheet holding member.

30 31. The sheet feeder according to claim 29, wherein the holder member includes a restriction member that restricts movement of the arm member toward the first gear when the clutch gear is engaged with the first gear.

32. A sheet feeder, comprising:

a sheet holding member that holds sheets;

a pick-up roller that contacts the sheets held by the sheet holding member and feeds a topmost one of the sheets;

a drive shaft that is directly or indirectly connected to the pick-up roller and is separated from the sheet holding member by a fixed distance;

5 a holder member that is rotatably mounted to the drive shaft, rotatably supports the pick-up roller, and pivotally moves toward the sheet holding member when the drive shaft rotates in a predetermined direction; and

a transmission member that transmits a drive force lower than a predetermined amount to the drive shaft by friction transmission.

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